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Published in:
Schizophrenia Research

DOI:
[10.1016/j.schres.2009.03.026](https://doi.org/10.1016/j.schres.2009.03.026)

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Document Version
Publisher's PDF, also known as Version of record

Publication date:
2009

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Wolters, H. A., Knegtering, H., van den Bosch, R. J., & Wiersma, D. (2009). Effects and side effects of antipsychotic treatment in schizophrenia: Pros and cons of available self-rating scales. *Schizophrenia Research*, 112(1-3), 114-118. <https://doi.org/10.1016/j.schres.2009.03.026>

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Effects and side effects of antipsychotic treatment in schizophrenia: Pros and cons of available self-rating scales

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ARTICLE INFO

Article history:

Received 10 October 2008

Received in revised form 12 March 2009

Accepted 19 March 2009

Available online 23 April 2009

Keywords:

Schizophrenia

Self-rating scales

Antipsychotic treatment

ABSTRACT

Introduction: To support clinical practice as well as clinical research, self-rating scales have been developed to evaluate the effects and side effects of antipsychotic treatment. The aim of this study is to compare the psychometric properties and other characteristics of frequently used self-rating scales, and also to study their relationship to subjective quality of life.

Method: Four self-rating scales designed to evaluate the treatment effects of antipsychotics were identified through a MEDLINE and cross-references search: The Drug Attitude Inventory (DAI-10), The Liverpool University Neuroleptic Side Effect Rating Scale (LUNSERS), Subjective Well-being to Neuroleptics (SWN) and the recently developed Subjects' Reaction to Antipsychotics questionnaire (SRA). Three hundred and twenty patients with schizophrenia who were treated with antipsychotics completed these questionnaires, including a quality of life instrument, the WHO-QoLBREF.

Results: The self-rating scales differed in scope, number of items and subscales (total and subscale scores), but showed an acceptable internal reliability (Cronbach's alphas varying between .64 and .93) except for the DAI-10 (.52), and all were easy to complete (in less than 20 min). They did not strongly correlate with each other, except for the LUNSERS and SRA undesired experiences subscale ($r = .68, p < .01$). All correlations with quality of life were statistically significant, but were especially so for the SWN (.78, $p < .01$).

Conclusion: Clinicians interested in the experience of the effects and side effects of antipsychotic medication in their patients are well advised to carefully consider the pros and cons of the available rating scales. They differ with respect to their internal reliability, concurrent and conceptual validity, as well as with respect to desired and undesired effects, aspects of quality of life, and attribution to medication. The choice also depends on its intended use, whether in clinical practice or in research or in both.

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1. Introduction

Most patients with schizophrenia need pharmacological treatment for many years. Unfortunately, almost all patients also experience undesirable side effects during this treatment with antipsychotics (Fakhoury et al., 2001), which frequently result in an early discontinuation or switching of medication (Lieberman et al., CATIE-study 2005; Kahn et al., 2008; Ücok

and Gaebel, 2008). During the last three decades, interest in the influence of antipsychotic treatment and other treatment-related variables on patients' quality of life has been growing (e.g., Voruganti et al., 1997). The symptomatic treatment of schizophrenia with antipsychotic medication, therefore, should aim at the best quality of life by decreasing the severity of psychotic symptoms (desired effect) with no, or as few as possible, undesired effects. The effects of antipsychotic medication reported by patients is one of the factors associated with quality of life (QoL) (Naber, 1998; Voruganti et al., 2002; Hofer et al., 2004).

Until 1960, the evaluation of antipsychotic treatment was mainly based on the rather unstandardized assessment by

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clinicians of the changing prevalence of psychotic symptoms over the course of time. In the late twentieth century, structured interviews were introduced in order to improve the evaluation of treatment effects, but they required a great deal of training and proved to be too time consuming in clinical practice. Moreover, patients' subjective quality of life also became a focus of interest in this evaluation process (Katschnig et al., 1997). Self-rating instruments have been developed and several studies have demonstrated that schizophrenia patients are capable of completing such self-reports in a reliable way (Naber, 1998).

All studied instruments were included in a study targeted to investigate the reliability and validity of the newly developed Subjects Reaction to Antipsychotics questionnaire as principal objective. Details on the design of this study can be found in earlier publications (Wolters et al., 2003, 2006). The design of the original study anticipated the comparison of the included questionnaires, including their correlation with quality of life, in order to investigate the pros and cons of the questionnaires for clinical practice and research.

2. Methods

A MEDLINE search for 1997–2006 was performed using the terms antipsychotics, psychometrics and self-rating. We also checked cross-references. We found 22 papers that used a variety of scales, only four of which were relevant for our purpose: the self-rating of subjectively experienced effects and side effects of antipsychotic medication. The scales we identified are described below.

The *Drugs Attitude Inventory* (DAI; Hogan et al., 1983) was constructed by collecting statements from schizophrenia patients about their antipsychotic medication. These statements reflected both subjective feelings and attitudes. The scale was designed to predict drug compliance. Thirty items were found to discriminate significantly between compliant and non-compliant patients. This original DAI-30 had seven subscales: Subjective Positive (8 items; e.g., “feel more normal, get along better with people”), Subjective Negative (6 items; e.g., “cannot concentrate”), Health/Illness (3 items; e.g., “take only when sick”), Physician (2 items; e.g., “I know better than the doctor”), Control (2 items; e.g., “pressure to take medication”), Prevention (2 items; e.g., “by staying on medication I can prevent a breakdown”) and Harm (2 items; e.g., “medication will harm my body”). Analysis of reliability as well as discriminant and factor analysis was performed on data from 150 outpatients, approximately 40 years old, with an average of six hospitalizations and an admission duration of nearly four years. Ten items, which produced a maximum group separation between compliant and non-compliant patients, constituted the DAI-10. Six items were drawn from the first two subjective subscales and four items from the attitude scales. Each item was scored as yes (1) or no (0). The total score ranged from 1 to 10, with higher scores indicating a positive attitude to antipsychotic medication.

The *Liverpool University Neuroleptic Side Effect Rating Scale* (LUNSERS; Day et al., 1995) was developed as a self-rating scale for “measuring side effects of neuroleptic drugs.” Its items are mainly derived from the physician-rated UKU scale requiring training and 60 min administering time (Lingjaerde et al., 1987). The LUNSERS has 41 items, covering psychological, neurological, autonomic, hormonal and other miscellaneous side effects. In addition, ten “red herring” items, that is, symptoms that do not

directly relate to known antipsychotic side effects, were included to indicate the accuracy of the patient self-report. Items were rated on a five-point scale from (0) “not at all” to (4) “very much.” The total side effect score ranged from 0 to 164, with higher scores indicating more side effects. Validity and reliability were tested in a group of 50 male and female patients with a mean age of 46 years and 16 years of antipsychotic use, along with a group of 50 healthy controls. The validity of the LUNSERS was tested against the UKU.

The *Subjective Well-being on Neuroleptics* questionnaire (SWN) developed by Naber et al. (1994) and Naber (1995) measures the subtle subjective changes – possibly related to the use of antipsychotics – in the area of emotions, clarity of thinking, spontaneity and functioning. The Likert scale with six response categories (1–6) consists of 38 items based on clinical experience and on an examination of item-scale correlations, variance and subjective importance. There are five subscales: Emotional Regulation (8 items; e.g., “my emotions are steady and balanced”), Self-Control (6 items; e.g., “my thoughts always revolve around the same things”), Mental Functioning (8 items; e.g., “I find it easy to think”), Social Integration (8 items; e.g., “I feel lost and alone”) and Physical Functioning (7 items; e.g., “I feel weak and exhausted”). The total score ranges from 38 to 190, with higher scores indicating greater well-being. Psychometric properties (stability, consistency, sensitivity, relationship to compliance, objective psychopathology, extra-pyramidal symptoms and quality of life) has been established in a group of 280 inpatients and outpatients, with 32 years of age on average and a duration of illness of six years (Naber, 1995).

The *Subjects Response to Antipsychotics* questionnaire (SRA, Wolters et al., 2006) measures “all responses to changes in mental, physical and social domains attributed by the patient to his/her current antipsychotic medication.” Items were collected by interviewing patients about changes and responses they attributed to the medication (Wolters et al., 2003). The full SRA questionnaire is a 74-item instrument with eight subscales, with 56 items in total. Subscales of the SRA are: Recovery (24 items; e.g., “I am more stable”), Weight gain (4 items; e.g., “I have more of an appetite”), Sexual anhedonia (3 items; e.g., “I have less need for sex”), Sedation (6 items; e.g., “I react slower”), Affective flattening (3 items; e.g., “my emotions are more level”), Extra-pyramidal side effects (5 items; e.g., “my muscles tense more”), Diminished sociability (6 items; e.g., “I have less need for social contacts”), and Increased sleep (3 items; e.g., “I sleep too much”). Eighteen miscellaneous items not belonging to a dimensional scale were not taken into account in this study. The desired effects or positive response were covered by the 24 Recovery items, and the undesired effects or negative response by 32 items from the other subscales. Items were scored on a three-point scale from (1) no, (2) yes to a certain degree to (3) yes to a high degree. Higher scores indicated more effects attributed to the antipsychotic medication by the patient. Validity, consistency and reliability were established in a group of 320 male and female inpatients and outpatients (see below and Wolters et al., 2006).

2.1. Subjects

A cross-sectional study was performed including 234 male and 86 female inpatients and outpatients with a diagnosis within the schizophrenia spectrum from eight mental health

Table 1

Characteristics and psychometric properties of self-rating instruments for side effects of antipsychotic treatment among 320 inpatients and outpatients.

Scales	DAI-10	LUNSERS	SWN	SRA
Aims of evaluation	Attitudes and beliefs towards doctor, health, and antipsychotic drugs that may influence compliance	Side effects of antipsychotics	Changes in emotionality, clarity of thinking, spontaneity and functioning	Responses to changes in mental, physical and social domains attributed to antipsychotics
Number of items	10	41	38	56
Number of subscales	1	1	1 total 5 subscales	2 total 7 subscales
Time to complete	5–10 min	10–15 min	10–15 min	15–20 min
Internal consistency (Cronbach's alpha)	Total score = .52	Total score = .85	Total score: .91 PF = .81 SI = .80 SC = .74 ER = .73 MF = .64	D (desired): .93 U (undesired): .92 WG = .82 SA = .80 S = .79 AF = .79 DS = .78 IS = .75 ES = .69

*DAI = Drugs Attitude Inventory; LUNSERS (excluding 10 “red herring” items) = Liverpool University Neuroleptic Side Effect Rating Scale; SWN = Subjective Well-being on Neuroleptics (subscales: PH: Physical Functioning; SI: Social Integration; SC: Self-Control; ER: Emotional Regulation; MF: Mental Functioning); SRA (excluding 18 miscellaneous items) = Subjects' Response to Antipsychotics questionnaire, excluding 18 miscellaneous items (subscales: D: desired or recovery; and U: undesired; WG: Weight gain; SA: Sexual anhedonia; S: Sedation; AF: Affective flattening; DS: Diminished sociability; IS: Increased sleep; ES: Extra-pyramidal side effects).

services in the Netherlands. Inclusion criteria were a diagnosis of schizophrenia or schizo-affective disorder according to DSM-IV criteria, along with treatment with antipsychotic medication for at least six weeks. Patients needed to be willing and able to understand the purpose of the study and to give informed consent. Exclusion criteria were the use of lithium or antidepressant medication. Their mean age was 35 years (SD 11.5). Of the patients, 25.5% used classic antipsychotic medication, 23.5% risperidone, 22.5% clozapine, 19.0% olanzapine and 9.5% used quetiapine. Only 17 patients (5.3%) used two different antipsychotic medications. Other co-medication (mainly benzodiazepines, $N = 72$) was taken by 126 patients. The duration of antipsychotic medication use was more than one year for 76% of the patients.

All patients were able to complete the questionnaires; most (90%) did not need any assistance. They had to fill in the four above-mentioned self-rating scales on the effects of antipsychotic medication. In addition, a quality of life (QoL) scale had to be filled in, that is, the WHOQoL-BREF from the World Health Organization (The WHOQOL Group, 1998). Briefly, the WHOQoL-BREF is a 26-item self-report questionnaire with a five-point Likert scale ranging from (1) “not at all/very poor” to (5) “an extreme amount/very good.” The total score ranges from 26 to 140, with higher scores indicating a better quality of life. The WHOQoL-BREF defines QoL as an individual's perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. This definition reflects the view that quality of life refers to a subjective evaluation that is embedded in a cultural, social and environmental context. The WHOQOL-BREF has good to excellent psychometric properties (Skevington et al., 2004).

2.2. Statistics

The subscales of all the instruments were constructed according to the instructions of their respective developers.

Internal consistency was calculated for all scales using Cronbach's alpha (Cronbach, 1951), with a coefficient of at least 0.70 taken as acceptable (Cicchetti, 1994). Spearman correlations were calculated for the association between the self-rating scales and subscales for effects and WHOQoL-BREF. Data were analyzed in SPSS, version 14.

3. Results

Table 1 shows information about the aims, number of items and subscales, completion time and internal consistency. Completion time varies between 10 and 20 min without any report of much help needed. The internal consistency of total and subscale scores is in most cases moderate to very good, except for the DAI-10.

Most correlations are significant as expected. Table 2 provides the correlations between the self-rating scales. The DAI-10 is moderately positively correlated with the desired SWN and the SRA desired (.50) but less negatively with LUNSERS and SRA undesired, thus indicating that the DAI is picking up the more favorable responses instead of the negative responses. The LUNSERS is quite strongly correlated

Table 2

Spearman correlations between the total scores of self-rating instruments for the side effects of antipsychotic treatment and quality of life.

	LUNSERS	SWN	SRA undesired	SRA desired	QoL
DAI-10	-.21*	.31*	-.25*	.50*	.30*
LUNSERS		-.49*	.68*	.06	-.58*
SWN			-.35*	.25*	.78*
SRA undesired				.11	-.46*
SRA desired					.25*

* $p < .01$.

DAI = Drugs Attitude Inventory; LUNSERS = Liverpool University Neuroleptic Side Effect Rating Scale; SWN = Subjective Well-being on Neuroleptics; SRA = Subjects' Response to Antipsychotics questionnaire; desired (recovery) and undesired; QoL = Quality of life (WHOQoL-Bref).

with SWN and SRA undesired (.68), but is not significant with SRA desired, thus indicating only overlap in the measurement of negative experiences. The SWN shows its highest correlation with the LUNSERS (−.49). The SRA is most strongly associated with the LUNSERS (.68; SRA undesired) and the DAI-10 (.50; SRA desired).

3.1. Association with the subjective quality of life

All scales are significantly correlated with quality of life as measured with the WHOQoL-BREF. SWN has a particularly high (positive) correlation (.78), which means that well-being and quality of life are almost identical. A negative association is found with the LUNSERS (−.58) and the SRA undesired (−.46) and a small positive association occurred with the DAI-10 (.30) and the SRA desired (.25).

4. Discussion

This study shows that the DAI-10, LUNSERS, SWN and SRA differ in scope, objectives, number of items and subscales, but all have good to excellent internal consistency (.64–.93 for total and subscales), except for the DAI-10 (.52). All could be completed by more than 90% of the patients who agreed to participate in the study, without help and in less than 20 min.

The psychometric qualities of the instruments as found in this study are in line with earlier studies for the SWN and LUNSERS. The original 30-item version of the DAI had good internal (.93) and test–retest reliability (.82), but this was never replicated for the DAI-10. This has been the first study of the psychometric qualities of the SRA.

Although all scales aim at measuring the effects of antipsychotic medication, there are clear differences as to internal consistency, and concurrent and conceptual validity. The DAI-10 is a complicated scale in terms of evaluating the different conceptual aspects of antipsychotic treatment, not only vis-à-vis side effects, but also knowledge and attitudes towards treatment. This has resulted in a low internal consistency. The highest correlation is with the desired SRA, indicating an association with positive aspects instead of the negative side effects of the medication. Although the majority of the patients are able to complete the DAI without help within 5 min, the lack of internal consistency and its weak association with QoL will limit its use in evaluating drug treatment in clinical practice and treatment research.

The LUNSERS is a reliable scale for evaluating several dimensions of the undesired side effects of treatment with antipsychotics and it has the highest association with the SRA undesired (concurrent validity). More undesired treatment effects are associated with a lower score on QoL and SWN. However, several negative experiences as recorded in these items could also have other origins besides antipsychotic treatment (e.g., constipation or weight loss). Therefore, the LUNSERS may overestimate the frequency of side effects.

The SWN has good psychometric qualities and evaluates, in line with its name, the well-being of patients. It is difficult to see how the items are linked to the positive or negative effects of treatment in general and to antipsychotic treatment in particular. The high correlation with the WHOQoL-BREF, therefore, is not surprising and the SWN could in fact be considered an alternative for a quality of life instrument in

this population. The SWN may be less suitable for evaluating drug treatment in clinical practice.

The SRA evaluates desired (one dimension) as well as undesired (several dimensions) treatment effects as attributed by the patient to his/her antipsychotic treatment. This attribution has advantages and disadvantages: is the patient indeed capable of making such statements, or might his lack of insight be biasing his response by externalizing his negative feelings about his condition to the medication? In other cases, it has been established that patients with schizophrenia are quite capable of making balanced attributions of effects to their antipsychotic medication (Wolters et al., 2006). The SRA and its various subscales may be useful in clinical practice in order to assist in optimizing treatment with antipsychotics, as well as in research concerning patient preferences, compliance and pharmacology.

This study had quite a high number of patients ($n = 320$), but no follow-up (therefore, no test–retest reliabilities) and no objective assessment of side effects by a psychiatrist. This is one limitation of this study. Another limitation lies possibly in the selection of patients. All were willing to be treated with antipsychotics and to participate in this study. They had to be able to concentrate, read and respond to a large number of questions. The results could end up being different for less compliant patients or for patients with other diagnoses.

5. Conclusion

Taking into account the limitations of the study, we can conclude that because of its weak psychometric qualities the DAI-10 is not to be recommended for evaluating antipsychotic drug treatment. Its strength lies in measuring compliance and attitudes towards antipsychotic treatment. The LUNSERS may be very useful for extensive screening of the side effects of antipsychotic treatment, with the caveat of overestimating the frequency of these effects. The SWN is to be recommended as an alternative for a QoL instrument in patients using antipsychotic medication. The SRA can be recommended if a clinician or researcher is specifically interested in undesired, as well as desired, responses attributed to the antipsychotic medication, although one should keep in mind that only the opinion of the patient should be recorded. This is a limitation found in all four self-rating scales.

Role of funding source

This work was supported by unrestricted grants from Janssen-Cilag, Eli Lilly, Astra-Zeneca and Rob Giel Research Centre. Janssen-Cilag, Eli Lilly and Astra-Zeneca played no role in the study design, data collection, analysis and interpretation of the data; or in the writing of the report; or in the decision to submit the manuscript for publication.

Contributors

Authors 1 and 2 designed the study and wrote the protocol. Author 1 performed the data analysis with the contribution of Authors 2 and 4. All authors contributed to the literature search and original draft of the manuscript. All authors reviewed and approved the manuscript in its final version.

Conflict of interest

(Hende)Rikus Kneegtinger received unconditional research grants from Astra-Zeneca, Eli Lilly, Janssen-Cilag and Bristol-Myers Squibb and has been working in advisory boards of Eli Lilly en Janssen-Cilag.

Hugo Wolters received unconditional research grants from Astra-Zeneca, Eli Lilly and Janssen-Cilag.

Acknowledgements

We gratefully acknowledge unrestricted financial support from Janssen-Cilag, Eli Lilly, Astra-Zeneca, The Rob Giel Research Centre and the institutions that collaborated in the studies: University Medical Center Groningen, Lentis (GGZ Groningen), Stichting GGZ Drenthe, Stichting GGZ Friesland, Stichting Adhesie, Stichting GGZ Eindhoven and Parnassia.

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